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| EXAMINER | | | | |
| SPORER, ERIC NOLAN | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/574,200

Applicant(s)

NAGAI ET AL.

Examiner

ERIC SPORER

Art Unit

3753

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,8,11-14,16 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3,8,11-14,16 and 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6 August 2009, 9 September 2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This office action is responsive to the amendment filed on 12/11/2006. As directed by the amendment: claims 4-5 have been cancelled and claim 3 has been amended.

Thus, claims 3, 8, 11-14, 16 and 27-31 are presently pending in this application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 3-5, 8, 11, 12,-14, 16, 27-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Chemical Corp. (JP 2003-047832A) in view of Hayakawa et al. (Pub. No.: US 2002/0016250) and Niino et al. (DE 19708373).

4. Regarding claim 3, Mitsubishi Chemical Corp. teaches a method of controlling a flow of a fluid inside a microchannel which uses the control of hydrophobic and

hydrophilization (Paragraph [0031]). Mitsubishi Chemical Corp. discloses neither the step releasing of a substance, nor the step of use of light energy as a process control. Hayakawa et al. teach the process of irradiation a hydrophilization portion of a surface in order to alter decrease the contact angle (Paragraph [0081]), for the purpose of altering contact angle without a need for any electrical or thermal contact. Niino et al. teach the process of releasing a substance, in which substance is brought in contact with the hydrophilization surface to adhere to the surface and increase the contact angle of water by improving the hydrophobic property (Paragraphs 10-11), also for the purpose of altering contact angle without a need for any electrical or thermal contact. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method disclosed by Mitsubishi Chemical Corp. to use the irradiation of light to decrease the contact angle of the hydrophilization portion, as taught by Hayakawa et al., and to release a substance and bring it into contact to with the surface of the hydrophilization portion to increase the hydrophilization portion, as taught by Niino et al., for the purpose of altering contact angle without a need for any electrical or thermal contact.

5. Regarding step (4) of irradiating the hydrophilization portion a second time it would have been obvious to a person having ordinary skill in the art to repeat this process, for the purpose of further hydrophilization of the surface. Where a step has already been disclosed, it would be in the within ordinary skill in the art to repeat the step for the same purpose as the already disclosed steps.

6. Regarding claim 8, Niino et al. further teach wherein means to release the substance for increasing a contact angle of water from the material for controlling a contact angle of water is irradiation of light (UV laser, Page 5 Lines 15-16)

7. Regarding claim 11, Niino et al. further disclose wherein the material for controlling a contact angle of water which contains the substance for increasing a contact angle of water comprises the substance for increasing a contact angle of water alone or is a solid containing the substance for increasing a contact angle of water (Page 5 Lines 3-4, solid layer containing photoreactive substance).

8. Regarding claims 12 and 13, Mitsubishi Chemical Corp. in view of Hayakawa et al. and Niino et al. disclose the claimed invention except wherein the material for controlling a contact angle of water is PDMS containing an organosilicon compound for increasing a contact angle of water. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the material for controlling a contact angle of water be PDMS containing an organosilicon compound for increasing a contact angle of water, for the purpose of using commonly available and easily moldable and workable materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

9. Regarding claim 14, Mitsubishi Chemical Corp. further disclose wherein the portion other than the hydrophilization portion in the microchannel is made of the material for controlling a contact angle of water which contains the substance for increasing a contact angle of water.

10. Regarding claim 16, Niino et al. further teach wherein a hydrophobic portion is selectively provided by selectively applying light or heat on a specific region of the material for controlling a contact angle of water through a shielding pattern (see Page 7 lines 15-16). Mitsubishi Chemical Corp. also further discloses the used of a mask for hydrophilization or hydrophobing (Paragraph [0032]).

11. Regarding claim 27, Niino et al. further teach wherein the substance being capable of decreasing a contact angle of water by irradiation of light is a substance having a photocatalytic action (disclosed as being photoreactive, Page 2 Paragraph 4).

12. Regarding claim 28, Hayakawa et al., further teach the use of a titania (titanium dioxide) as the hydrophilization portion substance.

13. Regarding claim 29, Niino et al. further teach wherein a light source is a laser generator. The light is disclosed to be a UV laser beam, and therefore, the source is inherently a laser generator.

14. Regarding claim 31, Niino et al. further disclose wherein a hydrophobic portion is selectively provided by selectively applying light or heat on a specific region of the material for controlling a contact angle of water through a shielding pattern (see Page 7 lines 15-16). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the same method for the hydrophilization portion.

15. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Chemical Corp. in view of Hayakawa et al. and Niino et al. and further in view of Sullivan et al. (US Pat. 5,821,680).

16. Regarding claim 30, Mitsubishi Chemical Corp. disclose the claimed invention except wherein the method of light irradiation is an irradiation method capable of changing a focus in the depth direction. Sullivan et al., however, teach the use of an irradiation method of a KrF laser capable of changing a focus in the depth direction for the purpose of controlling energy density on the target surface (Col. 5, Lines 52-54). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method of light irradiation disclosed by Niino et al. to be an irradiation method capable of changing a focus in the depth direction, as taught by Sullivan et al., for the purpose of controlling energy density on the target surface.

Double Patenting

17. Claims 3-5, 8, 11-13, 16, and 27-31 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 3, 4, 15 and 36-47 of copending Application No. 10,573,967. Although the conflicting claims are not identical, they are not patentably distinct from each other because although a minor difference in wording exists, the copending claims are substantially coextensive in scope. Claim 28 is not coextensive in scope with the copending application, however it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

18. Applicant's arguments filed 9 September 2009 have been fully considered but they are not persuasive.

19. In response to applicant's arguments that neither reference cited teaches a change in fluid flow by applying energy, it is the examiner's position that Hayawaka et al. anticipate the claimed method of controlling a flow of a fluid in a microchannel, by creating hydrophobic and hydrophilic portions, thereby controlling the flow of water flowed in the channel. The change or switching of applicant's arguments is an unclaimed step, and it is the examiner's position that the invention as claimed does not require any dynamic switching.

1. In response to applicant's argument that Niino et al. do not teach the controlling of fluid flow in a microchannel, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. It is the examiner's position that while Niino et al. do not teach the controlling of a fluid flow in a microchannel, the reference's teaching of irradiation of light upon a surface to alter contact angle of water on the surface would have suggested to one having ordinary skill in the art at the time the invention was made to irradiate light to alter the contact angle of water in the channels disclosed by Hayawaka et al., for the purpose of altering contact angle without a need for any electrical or thermal contact.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC SPORER whose telephone number is 571-270-7834. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on (571)272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC SPORER/
Examiner, Art Unit 3753
/Len Tran/
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